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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Naoto NAKAMURA et al.

Group Art Unit: 2893

Application No.: 10/528,069

Examiner: H. TRINH

Filed: July 10, 2005

Docket No.: 122733

For: THERMAL TREATMENT APPARATUS, METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICE, AND METHOD FOR MANUFACTURING SUBSTRATE

SUMMARY OF SUBSTANCE OF INTERVIEW

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants' representatives conducted a personal interview on April 6, 2009 with Examiner Trinh. Applicants appreciate the courtesies shown to Applicants' representatives by Examiner Trinh in the April 6 personal interview. Applicants' separate record of the substance of the interview is incorporated in the following remarks.

Applicants' representative presented information that thickness of the supporting portion being not less than twice a thickness of the substrate, being supported by Applicants' specification, at least, on page 5, lines 17-20 of Applicants' specification. Also, the supporting portion is not in contact with a periphery of the substrate, is supported by Applicants' specification, at least, on page 17, lines 10-19.

Applicants' representative noted that Takehiro teaches a silicon wafer 10 with a diameter smaller than the silicon monocrystal wafer undergoing heat treatment on a support plate 11. Alternatively, a wafer-shaped or ring-shaped support 13 having a concentric convex part 12 at the center that is used as the support (see, e.g., Abstract). Applicants' representative

pointed out, however, that Takehiro would not have suggested any ratio of the thickness of silicon wafer 10 to silicon monocrystal wafers 1. Further, Takehiro would not have suggested any reason why the thickness of silicon wafer 10 would have had any effect on the heat treatment of the silicon monocrystal wafers.

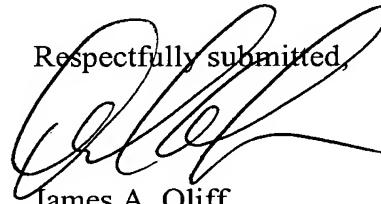
Applicants' representative noted that an issue solved by this application concerns warping of a support portion due to expansion coefficient differences between a thin film on a support portion and the bulk material of the support portion. This difference causes the support portion to warp as it is heated. The warping is directly related to the thickness of the thin film and the thickness of the bulk of the support substrate. Thus, thickening the bulk of the support portion reduces this bending. None of these issues are disclosed by the applied references, Takehiro and JP-A-10-242254 to Satoshi (hereinafter "Satoshi"). Further, Takehiro teaches away from thickening of, at least, a silicon carbide support plate at *e.g.*, paragraph [0009]. Takehiro teaches that increasing by 1 mm or more of a silicon carbide support plate increases in the heat capacity of the silicon carbide support plate and causes increased slip defects. Thus, one of ordinary skill would have concluded from the teachings of Takehiro that increasing the thickness of, at least, a silicon carbide a support plate would have increased the heat capacity of the support member causing a temperature gradient between the support portion and the substrate, thereby increasing the slip dislocations in the monocrystal wafers 1.

As discussed during the personal interview, the size and thickness of standard silicon wafers are related. Larger diameter wafers are thicker. One of ordinary skill faced with the problems of Takehiro would have used a standard silicon wafer as silicon wafer 10. Because this wafer has a smaller diameter than silicon monocrystal wafers 1, the thickness of silicon wafer 10 would have been thinner than the monocrystal wafers 1. Takehiro, as argued above, would not have suggested any issue with the wafer, the silicon wafer 10 being thinner than

monocrystal wafer 1. Therefore, one of ordinary skill would not have been motivated to experiment with more expensive and more difficult to obtain, thicker wafers of smaller diameter.

In view of the above discussion, Applicants respectfully assert that it would not have been obvious to one of ordinary skill to have used a silicon wafer 10 more than twice as thick as silicon monocrystal wafer 1. Further, it would not even have been obvious to experiment with the thickness of silicon wafer 10.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Daniel A. Tanner, III
Registration No. 54,734

JAO:MIL/lmf

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OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

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